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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/736,232	12/15/2003	Godwin Liu	22126.0002U1	3147

23859 7590 07/26/2005
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EXAMINER

JAWORSKI, FRANCIS J

ART UNIT PAPER NUMBER

3737

DATE MAILED: 07/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/736,232

Applicant(s)

LIU ET AL.

Examiner

Jaworski Francis J.

Art Unit

3737

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on September 20, 2004 IDS.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 09202004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Specification

The specification is queried regarding the use of the terms " scan line based image reconstruction ". Specification para [0025] appears to suggest that individual scanlines are registered to the ECG and therefore serve as the unit by which the composite image set is refreshed. Paras [0038 and 0039] appear to dilute this definition by intimating that a region of either two-dimensional or three-dimensional type may alternatively be used as a 'scan line based image reconstruction' i.e. set of scanlines or a volume subsector. Applicants are requested to clarify the scope of this term particularly since in the trivial sense nearly all ultrasound image operations are based upon scanlines due to the physical demand of ensonating directionally with a pressure wave.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

Art Unit: 3737

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Foster et al (IEEE Ultrasound Symposium 200 pp. 1633 et seq., of record with the September 20, 2004 IDS submission) in view of Bonnefous (US5579771) or Newman (US6544175) or Clark (US6139500) or Hongo et al (US4991589).

The former establishes that high frequency high frame rate scanning is appurtenant to volume cardiac scanning of the rapidly beating yet proximally located mouse heart (proximity enables high frequencies otherwise severely attenuable to be used.). It would have been obvious in view of Bonnefous cols. 10-11 bridging to achieve higher frame rates by collapsing image field widths obtained with cardiac cycle registry so that with the maximum line acquisition rate fixed by sound velocity echo latency is distributed among more frames, since a mouse heart is rather small in spatial extent. In the alternative a similar argument may be made for the subvolume cardiosynched imaging of Newman col. 6 lines 3-45, or the 'available departure time' approach of Clark which is a more flexible variant of volumetric scanning in which spatio-temporal image data gaps are filled using full scan planes fired at correct spatial and temporal departures with the latter indexed by progression of the ECG. Finally in Hongo et al Fig. 4 the subframes are assembled into frames using ECG registry with particular attention to bloodflow analysis.

Art Unit: 3737

Alternatively stated and with attention to the specification ambiguity serving to define the claims terminology, the Examiner is taking the position that, given that high frequency high frame rate scanning was known for small animal study, the breaking up of volumes or frames into subunits or collapsed width frames under acquisition in accordance with ECG timings to achieve higher frame rates would have been well-known in the art.

Powers et al (US5099847) and Thomenius (US4572202) are cited to complete the record as directed to high frame rate ultrasound imaging.

Any inquiry concerning this communication should be directed to Jaworski Francis J. at telephone number 571-272-4738.

FJJ:fjj

07-21-2005



Francis J. Jaworski
Primary Examiner